



**New York State
Department of Civil Service**

Committed to Innovation, Quality and Excellence

A Guide to the Written Test

for the

Firefighter Series



George E. Pataki
Governor

Daniel E. Wall
Commissioner

INTRODUCTION

The New York State Department of Civil Service has developed this Guide to familiarize you with the Firefighter Series written test. It provides a general description of the subject areas to be tested and the different types of questions you will see on the test. The Examination Announcement will specify the exact subject areas to be included on the test you will be taking.

FIREFIGHTER EXAMINATION FOR ALL MUNICIPALITIES EXCEPT: White Plains, Mt Vernon, and New Rochelle:

The Firefighter Series written test for these examinations has an overall time allowance of 3 ½ hours. The test is divided into four separate subject areas and the questions are designed to evaluate the following abilities:

- ❖ **UNDERSTANDING AND INTERPRETING GRAPHS, CHARTS, TABLES AND DIAGRAMS AND FOLLOWING WRITTEN INSTRUCTIONS:** These questions test your ability to understand information that is presented graphically or tabularly and to follow written directions.
- ❖ **SOLVING PROBLEMS INVOLVING NUMBERS:** These questions test your ability to use addition, subtraction, multiplication and division to solve problems that might be encountered in fire service activities.
- ❖ **MECHANICAL REASONING:** These questions test your ability to make accurate readings of dials and gauges or to demonstrate an understanding of how devices work.
- ❖ **UNDERSTANDING AND INTERPRETING WRITTEN MATERIAL PERTAINING TO FIRE:** These questions test how well you comprehend written material.

These are the only subject areas that will be included on the written test. Specialized knowledge of firefighting is not required.

The remainder of this guide explains how you are tested in each of these subject areas. A **TEST TASK** is provided for each subject. This is an explanation of how a question is presented and how to correctly answer it. Be sure to read each one carefully.

You will also be given at least one **SAMPLE QUESTION** for each subject area. It will be of the type that you will see on the actual test. The **SOLUTION** and correct answer are provided after each question. You should study the question and its solution until you understand how it works.

FIREFIGHTER EXAMINATION FOR WHITE PLAINS, MT. VERNON AND NEW ROCHELLE ONLY:

The Firefighter Series written test for these examinations has an overall time allowance of 3 ½ hours. The test is divided into five separate subject areas and the questions are designed to evaluate the following abilities:

- ❖ **SOLVING PROBLEMS INVOLVING NUMBERS:** These questions test your ability to use addition, subtraction, multiplication and division to solve problems that might be encountered in fire service activities.
- ❖ **UNDERSTANDING AND INTERPRETING WRITTEN MATERIAL PERTAINING TO FIRE:** These questions test how well you comprehend written material.
- ❖ **MECHANICAL REASONING:** These questions test your ability to make accurate readings of dials and gauges or to demonstrate an understanding of how devices work.
- ❖ **GENERAL SCIENCE:** These questions test your knowledge of general science and your ability to apply basic science principles to given situations.
- ❖ **REASONING CLEARLY AND SELECTING A PROPER COURSE OF ACTION IN FIREFIGHTING SITUATIONS:** These questions test your ability to evaluate a situation a firefighter may encounter on the job and to select the most appropriate course of action.

These are the only subject areas that will be included on the written test. Specialized knowledge of firefighting is not required.

The remainder of this guide explains how you are tested in each of these subject areas. A **TEST TASK** is provided for each subject. This is an explanation of how a question is presented and how to correctly answer it. Be sure to read each one carefully.

You will also be given at least one **SAMPLE QUESTION** for each subject area. It will be of the type that you will see on the actual test. The **SOLUTION** and correct answer are provided after each question. You should study the question and its solution until you understand how it works.

SUBJECT AREA

UNDERSTANDING AND INTERPRETING GRAPHS, CHARTS, TABLES AND DIAGRAMMS AND FOLLOWING

WRITTEN INSTRUCTIONS: These questions test your ability to understand information that is presented graphically or tabularly and to follow written directions.

TEST TASK: You will be given questions that contain such things as graphs, charts, tables, diagrams or operating instructions for devices. You must locate information on these charts, tables or diagrams or follow instructions for operating devices in order to answer the questions.

All information required to answer a question is provided. Specialized knowledge of the subject matter is not required to successfully answer the questions.

SAMPLE QUESTIONS:

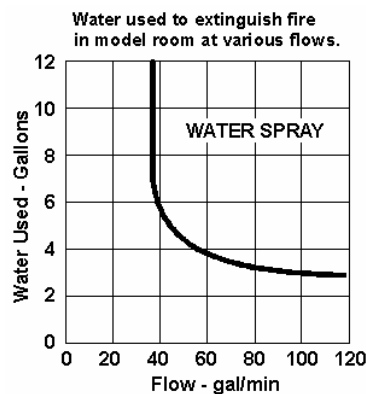
1. According to the information in the chart below, which one of the following is the pump pressure required to produce a nozzle pressure of 80 when using 3½" hose?

- A. 89 psi C. 128 psi
B. 105 psi D. 355 psi

FRICTION LOSS COMPARISON 500 gpm Flowing Through 500' Hose			
Hose Diameter	Nozzle Pressure psi	Friction Loss psi	Pump Pressure psi
2 ½"	80	275	355
3"	80	106	186
3 ½"	80	48	128
4"	80	25	105
5"	80	9	89

SOLUTION: The question asks what PUMP PRESSURE is required. Therefore, you know that the answer is contained in the column labelled Pump Pressure. You know that you are using a 3½" hose. Therefore, eliminate all but the 3½" hose row. Follow this row across to where it intersects with the Pump Pressure column. The answer is 128 (C).

2. According to the chart below, which one of the following statements best describes the relationship between the rate of flow in gallons per minute and the amount of water required to extinguish a fire when the rate of flow is between 40 and 80 gal/min?
- A. The greater the flow, the less water required for extinguishment. C. The greater the flow, the more water required for extinguishment.
B. The greater the flow, the less water required, up to a point; then greater flows required more water for extinguishment D. There is no discernible relationship between the flow and the amount of water required for extinguishment.



SOLUTION: Looking at the diagram, you can observe that at a flow of 40 gallons per minute it would take nearly 6 gallons of water to extinguish the fire. If you increase the flow to 80 gallons per minute, it would take less than 4 gallons of water. Therefore, you know that a greater flow means less water used. Now, evaluate the choices. The answer is (A).

SUBJECT AREA

SOLVING PROBLEMS INVOLVING NUMBERS: These questions test your ability to use addition, subtraction, multiplication and division to solve problems that might be encountered in fire service activities.

TEST TASK: You will be required to use addition, subtraction, multiplication, and division to solve problems that might be encountered in fire service activities. In some of the questions, sketches of simple geometric figures may be shown or simple geometric terms used. The problems are presented in the context of the job. Knowledge of firefighting is not required. Formulas will be provided where required.

SAMPLE QUESTIONS:

3. A pump discharges water at a rate of 184 gallons per minute. Which one of the following is the number of gallons of water this pump will discharge in an hour?
- A. 1,104 gallons
 - B. 1,840 gallons
 - C. 2,208 gallons
 - D. 11,040 gallons

SOLUTION: *To solve this question you must know that there are 60 minutes in an hour. So you multiply 184 gallons (the amount discharged in one minute) by 60 (the number of minutes in an hour). The answer is 11,040 gallons (D).*

4. "Back pressure" is the pressure, measured in pounds/sq. in. (psi), which a column of water exerts against the engine or hydrant which is forcing the water through a pipe system or a hose stretched to a height. "Back pressure" can be found by multiplying 0.434 by the height of the pipe system, in feet. If the height of the pipe system is 180 feet, which one of the following is most nearly the "back pressure"?
- A. 7.8 psi
 - B. 78.1 psi
 - C. 708.2 psi
 - D. 7812.0 psi

SOLUTION: *This question asks about back pressure and tells you that back pressure can be found by multiplying 0.434 by the height of the pipe system, which you are told is 180 feet. Therefore, $0.434 \times 180 = 78.1$; and the answer is B. To answer this question, you also have to know where to place the decimal point.*

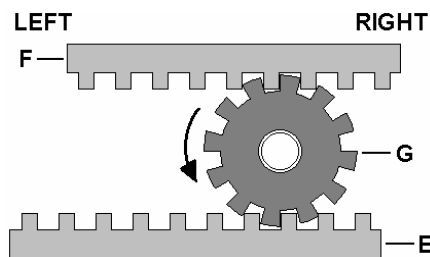
SUBJECT AREA

MECHANICAL REASONING: These questions test your ability to make accurate readings of dials and gauges or to demonstrate an understanding of how devices work.

TEST TASK: The questions in this subject area will be accompanied by sketches or descriptions of various mechanical devices, hand tools, dials or gauges. You will be required to demonstrate an understanding of how the devices work, or know the use for various tools or devices; or to make accurate readings of dials and gauges. The various devices, tools, gauges, etc., pictured or described in the subject area are commonly used and not limited to use in the fire service.

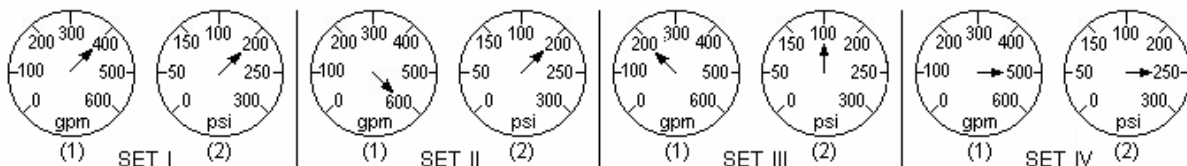
SAMPLE QUESTIONS:

5. In the figure below, how will the two racks, E and F, move when gear G is rotated on its fixed axis in the direction indicated by the arrow?
- A. both racks will move to the left
 - B. rack F will move to the left while rack E will move to the right
 - C. rack F will move to the right while rack E will move to the left
 - D. both racks will move to the right



SOLUTION: To answer this question, look at each part separately. What will happen to F when G moves? The teeth in G will lock with the teeth in F and cause F to move to the left. What will happen to E when G moves? The teeth in G will lock with the teeth in E and cause E to move to the right. Therefore, the correct answer is B.

6. The diagram below shows four sets of dials. Dial (1) in each set displays gallons per minute (gpm) Flow Rate. Dial (2) in each set displays pressure per square inch (psi). If a pump works most efficiently at a flow rate of less than 500 gpm and a pressure of 200 psi, which one of the sets of dials indicates a pump that is working most efficiently?
- A. Set 1
 - B. Set 2
 - C. Set 3
 - D. Set 4



SOLUTION: The question tells you that a pump works most efficiently at a flow rate of less than 500 gpm and a pressure of 200 PSI. It also tells you that dial (1) in each set is the gpm. Only two sets, I and III, have flow rates of less than 500 gpm. Set I is the only set that has a flow rate less than 500 gpm and a pressure of 200 psi. Therefore, the correct answer is A.

SUBJECT AREA

UNDERSTANDING AND INTERPRETING WRITTEN MATERIAL PERTAINING TO FIRE: These questions test how well you comprehend written material.

TEST TASK: You will be provided with brief reading selections, followed by a set of alternative statements relating to each selection. You must indicate the most appropriate statement relating to the selection on the basis of whether it: 1) accurately paraphrases portions of the selection; or 2) adequately summarizes the selection; or 3) presents an inference that can reasonably be drawn from the selection.

The reading selections are drawn from a variety of sources related to the firefighting field. Knowledge of the subject matter of the reading selection is generally not related to successfully answering the questions.

SAMPLE QUESTION:

7. "Oxidizing materials shall include a substance that yields oxygen readily to stimulate the combustion of organic matter. Oxidizing materials shall be stored in cool, dry, ventilated locations and separated from stored organic materials. Oxidizing materials shall be stored separately from flammable liquids, flammable solids, combustible materials, hazardous chemicals, corrosive liquids and such other noncompatible materials. Bulk oxidizing materials shall not be stored on or against wooden surfaces."

Which one of the following statements is correct according to the above passage?

- A. Oxidizing materials should be stored away from organic materials.
- B. Organic matter should be stored on wooden piles.
- C. Oxidizing materials should be stored with flammable solids.
- D. Corrosive liquids should be stored with hazardous chemicals.

SOLUTION: To answer this question, evaluate all the choices. Choice A states that Oxidizing material should be stored away from organic materials. The paragraph says that oxidizing materials shall be separated from stored organic materials. This choice is correct. Choice B states that organic material should be stored on wooden piles. The paragraph states that bulk oxidizing materials shall not be stored on... wooden surfaces. The paragraph does not discuss where organic material should be stored. Therefore, this choice is incorrect.

Choice C states that oxidizing materials should be stored with flammable solids. The paragraph states that oxidizing material shall be stored separately from flammable solids. So, this choice is incorrect.

Choice D states that corrosive liquids should be stored with hazardous chemicals. The paragraph states that oxidizing materials shall be stored separately from corrosive liquids but it does not state where corrosive liquids should be stored. Therefore, this choice is incorrect.

SUBJECT AREA

GENERAL SCIENCE: These questions test your knowledge of general science and your ability to apply basic science principles to given situations.

TEST TASK: You will be required to demonstrate knowledge of the basic principles of physics and chemistry, or the definitions of relevant terms, properties and processes: or to apply the knowledge to given situations. Topics cover such areas as: properties of common substances encountered in firefighting, basic principles of electricity, and basic principles of combustion and heat transfer. Knowledge of firefighting is not needed to answer the questions.

SAMPLE QUESTIONS:

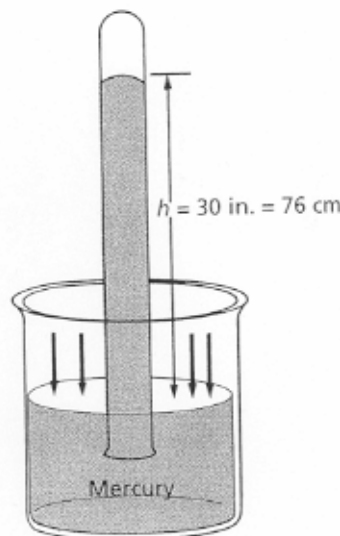
8. The density of a substance refers to which one of the following qualities?

- A. solubility
- B. compactness
- C. alkalinity
- D. weight

SOLUTION: To answer the question, evaluate all the choices. Density is the amount of mass in a definite volume, or simply how compact or crowded a substance is. Compactness, Choice B, most accurately reflects the meaning of the term density. Solubility, Choice A, and alkalinity, Choice C, are not related to the density of a substance. Density may affect the weight (Choice D) of a substance, but does not define the term density. Therefore, the best answer to this question is choice B, compactness.

9. The diagram below shows a filled tube of mercury inverted into a beaker of mercury. Which one of the following is responsible for supporting the column of mercury?

- A. air temperature
- B. atmospheric pressure
- C. salinity of the mercury
- D. viscosity of the mercury



SOLUTION: Looking at the diagram, you see a filled tube of mercury inverted into a beaker of mercury. Because the column of mercury has weight, some force must hold the column up. The only available force is atmospheric pressure, Choice B. The same principle applied in a mercury barometer is being applied in the diagram. External air pressure on the surface of the pool of mercury supports the column in the inverted tube. Therefore, the best answer to this question is choice B, atmospheric pressure.

SUBJECT AREA

REASONING CLEARLY AND SELECTING A PROPER COURSE OF ACTION IN FIREFIGHTING SITUATIONS:

These questions test your ability to evaluate a situation a firefighter may encounter on the job and to select the most appropriate course of action.

TEST TASK: You will be provided with a brief description of a situation which a firefighter may encounter on the job. You will be required to evaluate the situation and either select the most appropriate course of action or select the best reason in support of a particular course of action. Topics cover such areas as interpersonal factors related to dealing with other firefighters, superior officers or the general public. Specialized knowledge of firefighting is not required.

SAMPLE QUESTION:

10. You have been on the job as a firefighter for six months. After your company returns to the station from a fire alarm, your supervisor, the company officer, tells you to perform a safety check of the fire vehicle just used. On your way to conduct the safety check, the fire chief approaches you, informs you that city officials will be coming for a tour of the fire department, and that he would like you to wash the fire vehicle immediately. Which one of the following would be the best course of action for you to take in this situation?
- A. Say nothing and wash the fire vehicle as ordered.
 - B. Say nothing and proceed with the safety inspection of the fire vehicle.
 - C. Tell the fire chief that you will wash the apparatus right after you complete its safety inspection.
 - D. Inform the fire chief of the order you were given by the company officer.

SOLUTION: *In the situation described, you are given conflicting orders from your immediate supervisor and the fire chief. The order from your immediate supervisor is a safety concern while the fire chief's order is a public relations matter. The decision about which order is more important and which should be carried out first should be made by the fire chief. It is the firefighter's responsibility to inform the fire chief of the conflicting orders so that decision can be made. Therefore, the best answer to this question is choice D.*

TEST SECURITY

The test you will be taking is the property of the New York State Department of Civil Service. Candidates may not remove test material from the test site and may not reproduce, reconstruct, or discuss the test content with others. Unauthorized possession or disclosure of the test material is prohibited by law and punishable by imprisonment and/or a fine. Additionally, candidates may be disqualified from appointment to the positions for which the examination is being held and from being a candidate for any civil service examination for five years. After you take the test other individuals may want to talk with you about the test. You should not discuss the questions and answers, even in general terms. You need to be careful that you do not inadvertently violate test security and put yourself at risk.

CONCLUSION

Your attitude and approach to the test will influence how well you perform. A positive attitude will help you do your best. There are also practical things you should do.

Before the test ...

- Study and review this Guide to become familiar with the sample questions.
- Study and review the subject areas that will be covered on the test.

On the day of the test ...

- Arrive at the test site on time.
- Come to the test prepared; bring your admission notice, two No. 2 pencils, your photo ID containing your signature, a quiet lunch or snack and any other necessary materials. Do **NOT** bring this test guide to the test site.

During the test ...

- Read and follow all directions on your admission notice, test booklets, answer sheets, and Candidate Directions.
- Follow the Monitor's instructions.
- Keep track of the time.

After the test ...

- Do **NOT** remove any test materials from the test room and do **NOT** paraphrase, reconstruct or reproduce the test material in any way.
- Do **NOT** discuss the test material with others.

It is the policy of the New York State Department of Civil Service to provide reasonable accommodation to ensure effective communication of information to individuals with disabilities. If you need an auxiliary aid or service to make this information available to you, please contact the New York State Department of Civil Service Public Information Office at (518) 457-9375.

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The State Campus
Albany, NY 12239

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